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ADDITIONS TO THE FAMILY AMPHIPTERYGIDAE (ORDER—ODONATA)

By Lt.-Col. F. C. Fraser, I.M.S. Retd., F.R.E.S.

The Legion *Amphipteryx* was founded by Selys in 1853, as the 6th of the subfamily Calopteryginae, to accommodate the unique genus *Amphipteryx* Selys. In 1859 Selys added two more genera, *Devadatta* and *Diphlebia*, to the Legion which he now numbered as the 4th of the subfamily. It is interesting to note here that Selys, both in 1853 and 1859, mentioned that *Philoganga* appeared to be related to *Amphipteryx* and might possibly be accommodated in the same Legion. As will be seen in the sequel, his foresight has proved to be correct.

In 1909, Förster added a fourth genus, *Pentaphlebia*, to the Legion, and in 1926 Tillyard gave the Legion family rank. To the four genera which comprise it, I now add the genus *Philoganga* and, with but little doubt, the fossil genus *Steleopteron* Handl.

The family is of peculiar interest as, in it, one first comes across evidence of the passage of the Zygoptera from a Coenagrioid to an Agrioid type. In the Coenagriidae are found only the two primary antenodal nervures, but in the whole of the Amphipterygidae these are reinforced by a varying number of secondary antenodals, some of which have the costal and subcostal halves in strict alignment, three in the case of *Amphipteryx* and as many as four to seven in the case of *Devadatta*. A continuation of this process, until the whole of the secondary antenodals show alignment, brings the structure of the wing to the condition existing in the most recent of the Agriidae.

The six genera comprising the family, if one include the fossil genus *Steleopteron*, are distributed over five continents, two from S. Asia, one from Australia, one from W. Africa, one from S. America and one from the Upper Jurassic of Europe. This extremely disconnected distribution, taken in conjunction with the evident relationship of the Jurassic genus, shows that the family is a very archaic one.

Amphipteryx Selys.

This genus, a neotropical one, is known from a single species only, *A. agrioides* Selys. Among a small series in the British Museum collection, I have found one specimen in which the median space is traversed, in three out of its four wings, by a single nervure. So far as I know, this is the earliest occurrence of such nervures in the whole Order Odonata and is of great significance phylogenetically, since in the adjacent family Heliocharitidae, the median nervures are found cropping up again in the genus *Heliocharis*, and they are finally present in the whole of the American entogenic Agriidae. Thus there appears to be strong evidence of the descent of these American genera of the Agriidae from the Amphipterygidae through the Heliocharitidae. It must be understood that the presence, in all, of median nervures, is not the sole evidence for such a theory, but is further supported by that of the antenodal complex found in *Devadatta*, belonging to the same family Amphipterygidae.

Devadatta Kirby (= *Tetraneura* Selys, nom. preoc.) (fig. 1).

This genus is known from three species, *D. argyoides* Selys, *D. multinervosa* Fraser, and *D. podolestoides* Laidlaw. Whilst studying the venation of these three species recently, I was surprised to see a feature which appears to have escaped the notice of all authors, including myself, who have dealt with the genus. This is the fact that the venation of the fore-wings in *D. argyoides* and *D. podolestoides* differs markedly from that of the hind-wings, whilst that of *D. multinervosa* is similar in both wings and to that of the hind-wings in the other two species. Now in this last species, one finds as many as six or seven antenodal nervures of which the costal and subcostal halves coincide, whereas in the other two species only four are found to coincide. In the Coenagriidae, only the two primary antenodals coincide, so that this increase to four, in the case of the two species of *Devadatta*, *D. argyoides* and *D. podolestoides*, must be interpreted as the first evidence of the evolutionary passage from the Coenagrioid to the Agrioid condition, in which all the antenodals are found to coincide. The further increase of the antenodals to seven, in the case of *D. multinervosa*, clearly shows that it is more highly developed than the two other species. Further evidence to this effect is afforded by the post-costal nervures, which may be absent altogether or more usually number from two to four in *D. argyoides* and *D. podolestoides*, whereas in *D. multinervosa* they normally number five and may be increased to as many as seven. In the Agriidae they are always extremely numerous. Having established the higher development of *D. multinervosa*, I may now revert to the dissimilarity in the venation of the fore- and hind-wings found in the other two species (fig. 1). In the fore-wings, the nervures Riii,

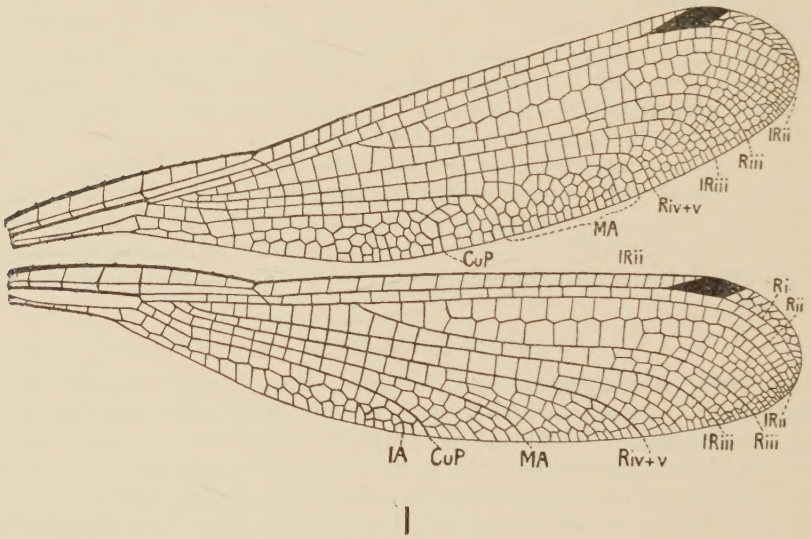

Fig. 1.—Wings of *Devadatta argyoides* (Selys). Note the marked variation between the venation of fore- and hind-wings.

IRiii, Riv + v, MA, CuP and IA, at their terminations, all take a sharp curve downwards towards the hind margin of wing, and, in the case of the two last nervures, break up into a series of arched pectinations, the fine curls of which may be likened to " breaking waves." In the hind-wings, these same nervures run with a gradual and rather flattened convexity to reach the hind margin.

This latter condition is common to both fore- and hind-wings of *D. multinervosa*, and is the chief distinguishing feature separating the species. Now since *D. multinervosa* has been shown to be more highly developed than the other two species, it is clear that the condition found in the hind-wings of all indicates a higher development than that found in the fore-wing. In the Anisoptera, the development of the hind-wing is always a stage in front of that of the fore-wing, and I believe that, in most cases, especially in the higher forms, the same can be said of the Zygoptera. Certainly it is the case here, for a comparison of the type of venation exhibited in the fore-wing must be looked for in *Podopteryx* of the MEGAPODAGRIIDAE, from the stem of which the family AMPHIPTERYGIDAE has most certainly arisen, whilst the type of venation found in the hind-wing more resembles that generally found in the AGRIIDAE. *Devadatta* is purely oriental.

Pentaphlebia Förster.

This genus is unknown to me save by description. The number of antenodals, five only, points to it being rather more archaic than the other genera belonging to the family. The genus is Ethiopian in distribution, and is known from one species only.

Diphlebia Selys.

This genus, which is confined to Australia, is known from four species; its chief interest, in so far as this paper is concerned, lies in the close similarity of both imago and larva to those of the genus, *Philoganga*, discussed next. The wings in both genera are very long and very narrow and the same may be said of the pterostigma; the body is remarkably robust; the resting habit, with widespread wings like a *Gomphus*, so unusual in the suborder Zygoptera, is common to *Diphlebia* and *Philoganga*. In regard to the larvae, one finds a much closer resemblance; both inhabit torrential mountain streams, clinging to the undersides of stones or rocks or hiding up in clefts of rocks. Their morphology is so closely similar that they could easily be confounded with one another. In short, on the evidence afforded by the close resemblance between the two larvae, one would not hesitate to place them in the same family. The antenodal complex is closely similar to that of *Devadatta* and *Amphipteryx*, and *Diphlebia* is undoubtedly more closely allied to these than to *Philoganga*. It is unfortunate that the larvae of the two first genera have not so far been discovered.

Philoganga Kirby (=*Anisoneura* Selys, nom. preoc.) (fig. 2).

This genus is known from three species, all oriental in distribution. Its exact position in the Odonata has long been a puzzle to students of the Order, but the discovery of its larva, described below and closely resembling that of *Diphlebia*, no longer leaves doubt as to its correct place in the family AMPHIPTERYGIDAE. Although the nodal index is much higher than in all the other genera comprising the family, only the two primaries are found to coincide: moreover the recession of the nervures IRiii and Riv + v has not proceeded so far as in these genera, so that it must be regarded as the most archaic in the family. The description of the larva of *Philoganga montana* (Selys) follows:

Larva: Total length from 30 to 40 mm.

Colour dark brown with some pale yellow markings on the distal five segments of abdomen in the form of sagittate middorsal basal spots and moderately broad lateral

stripes. The whole body, including head, greatly flattened to conform to the insect's habit of hiding beneath stones or in the clefts of rocks. Head about 5·0 mm. long and some 6·0 mm. broad; eyes rounded, widely separated and fringed laterally and just below, by a number of sharp spines, three of which are longer than the rest and gradually decrease in length from behind forwards. These project prominently from beneath the eyes just as they do in *Diphlebia*. Frontal shelf well developed; labium of great size, 6·5 mm. long and 5 mm. broad anteriorly, very flat, extending back so as to cover most of the prothorax; mentum scutellate, finely serrate laterally, projecting forward anteriorly and with a fine

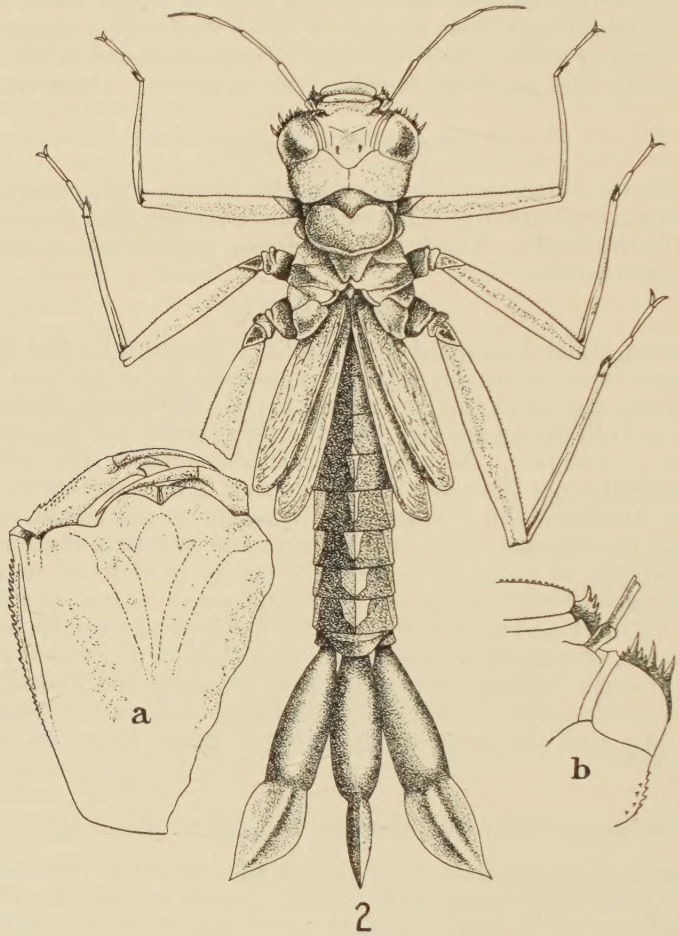

Fig. 2.—Larva of *Philoganga montana* (Selys). *a*. Labial mask seen from inner side. *b*. Side of head enlarged to show spines.

median cleft; no setae present; lateral lobes robust, coated with fine spines on the outer side and with one more robust than the others at the base; ending in a long, slender movable hook and three shorter, stouter ones, the medial one of which is much the longest. Thorax robust, broad and flattened; abdomen very short as compared with the rest of the body, slightly carinated dorsally. Legs robust, rather long, markedly flattened, especially the femora and held splayed out from the body to conform to the usual resting position on a flattened surface, devoid of hairs but the femora finely spined anteriorly. Caudal gills:

lateral pair 6·0 mm. long, median one-half that length (but somewhat shrivelled and probably longer during life), lateral pair saccoid or triquetral in proximal two thirds, broadly spatulate and acuminate for the distal third; median gill of very similar shape.

Habitat: Assam: Shillong. Found beneath stones in a small mountain stream full of boulders. The imago was frequently found resting, with wings spread flat out, on foliage beside this stream. The venation was fully developed in the larval wings and easily readable, especially in the distal three fourths; it was in this way that the larva was identified. It will be seen by a comparison with the description and figures given for *Diphlebia* by Tillyard, that this larva resembles that of the latter to a remarkable degree, so as to leave no room for doubt about their relationship. The failure of the secondary antenodals to coincide in the imago seems to indicate that its development along lines leading to an Agrioid type has ceased and that it is becoming specialised in a different direction.

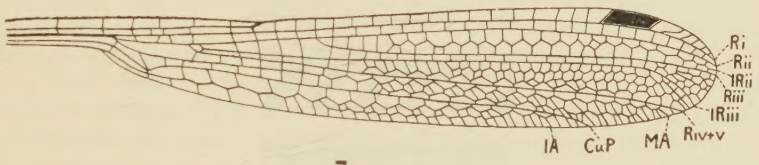

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Fig. 3.—Wing of *Steleopteron deichmülleri* Handl. Upper Jurassic, Solenhofen, Bavaria.

Steleopteron Handlirsch (figs. 3 & 4).

This genus of the Amphipterygidae was founded by Handlirsch to accommodate a single species from the Upper Jurassic of Solenhofen, Bavaria, *S. deichmülleri*. Handlirsch was in doubt as to its correct position in the Odonata, and so erected a new family to contain it, the Steleopteridae. He noticed the mingled Coenagrioid and Agrioid characters present in the wing venation, and evidently observed the nature of the antenodal complex, for he compared the wing with *Anisoneura* (*Philoganga*) and *Tetraneura* (*Devadatta*). The figure of the wing given in Handlirsch's Atlas, Pl. 47, f. 20, is very poor, and parts of it are difficult to interpret. Through the courtesy of the authorities of the Vienna Natural History Museum, I have been able to make a re-examination and a fresh figure of this fossil which was loaned to me for that purpose. Apart from the acute character of the discoidal cell in both fore- and hind-wings and a somewhat aberrant venation, there is no other special reason why this species should not be placed in the family Amphipterygidae; thus the name Steleopteridae becomes a synonym of the former.

This fossil wing is of great interest: it not only displays the wave-like, curling ends of the longitudinal nervures but shows in what way they were evolved; the terminations of MA and IA should be compared with those in the fore-wing of *Devadatta*. The formation is derived firstly from polygonal cells which later become bisected by a diagonal line passing from the middle of one side to that of the side opposite, as is well depicted in the space between MA and CuP; later still, these polygons are again bisected by a sector passing at right angles to the first diagonal but not in the same straight line, thus cutting each polygon into four separate ones. Each set is staggered, and by the addition of another such polygon beneath it the wavy pectination of the nervures is finally evolved.

In *S. deichmülleri* the downward sweep of IRiii is already accomplished as in *Devadatta*; a broadening of the wing would see the successive nervures following suit. The antenodal complex is almost identical to that of *Amphipteryx*; the discoidal cell, as has already been mentioned, is very acute distally and is similar in shape in all wings; its base shows no closing nervure in the fossil, but since the plane of the cell is set abruptly at an angle to that of the median space, and the line separating the two is quite straight, I have no doubt about such a nervure being present. Three wings, two of which are still attached to the thorax, are found in the fossil of *Steleopteron deichmülleri* and all exhibit practically identical venation. Thus the hind-wing, as well as the fore-wing, still preserves the wavy nature of the terminations of the longitudinal nervures, which has been lost in the hind-wings of *Devadatta argyoides* and *D. podolestoides*,

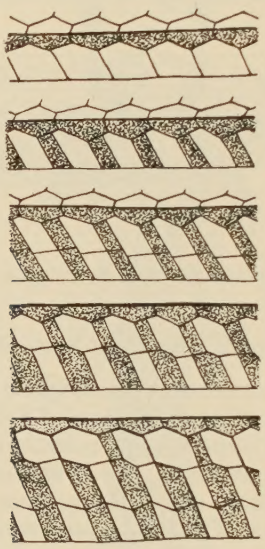

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Fig. 4.—Diagrammatic figure showing how the pectinated, wave-like endings of the longitudinal nervures found in *Devadatta argyoides* and *podolestoides* fore-wings are evolved from simple polygonal cells. Note how all stages of this are exhibited in *Steleopteron deichmülleri* Handl. (fig. 3). Alternating cells are shown shaded to demonstrate their alternating concavity and convexity, as in the case of the nervures.

and in all wings of *Devadatta multinervosa*, as well as in all species of the remaining genera of the family Amphipterygidae. Only a single row of cells is present distal to the pterostigma in *S. deichmülleri*, similar to the condition found in *Diphlebia* and *Philoganga*, but differing from *Devadatta* and *Amphipteryx*. Such differences are purely specific but may be becoming generic. (In this connection, it is convenient to correct a statement made by the late Dr. Tillyard in his paper No. 3, Mesozoic Insects of Queensland. Here, a propos the venation of the fossil species *Perissophlebia multiseriata* Till., he says, " As a general rule, both for recent and fossil Odonata, the space between C and R, distal to the pterostigma, contains only 1 row of cells." He then quotes *Petrothemis* Handl., and the Aeschnidiidae as exceptions to this rule, and goes on to say that

Perissophlebia stands on this character, as the most densely veined of all known Odonata. This is not entirely correct, as two or more rows of cells between C and R are found in many of the Zygoptera. In *Thaumatoneura* there are three to four rows between C and R, and as many as five rows between R and Rii, a number greater than in *Perissophlebia*. In many species of *Mnais*, *Thore*, *Sapho*, and *Echo*, as well as in *Podopteryx*, two rows between C and R are normal. The shape of the pterostigma in *Perissophlebia* suggests that of *Thaumatoneura* and *Podopteryx*, so that it seems much more probable, in spite of the great size of the species, that it belongs somewhere near the MEGAPODAGRIIDAE or AMPHIPTERYGIDAE.)

Summary : In this paper, the family AMPHIPTERYGIDAE has been enlarged to include the recent genus *Philoganga* and the Jurassic *Steleopteron*; the larva of *Philoganga montana* Selys is described and its close resemblance to that of *Diphlebia* pointed out. A hitherto unnoticed variation between the fore- and hind-wings of *Devadatta argyoides* and *D. podolestoides* is figured and described and contrasted with the venation of the third species *D. multinervosa*, in which it is similar in all wings. The phylogenetic significance of this is explained by comparing their venation with that of *Steleopteron deichmülleri* Handl., of which a figure, made from a re-examination of the type, has been prepared. The evolutionary progress from simple polygonal cells found in this last species to the ordered arrangement found in *Devadatta argyoides* is explained. Finally a short note is given on the probable relationship of *Perissophlebia multiseriata* Till. to the MEGAPODAGRIIDAE or AMPHIPTERYGIDAE.

My thanks are due to the authorities of the Natural History Museum, Vienna, for their courtesy in lending me the fossil type specimen of *Steleopteron deichmülleri* Handl., without which much of this paper could not have been written.

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A NEW MOTH OF THE FAMILY NOTODONTIDAE (LEPIDOPTERA)

By W. H. T. Tams, F.R.E.S.

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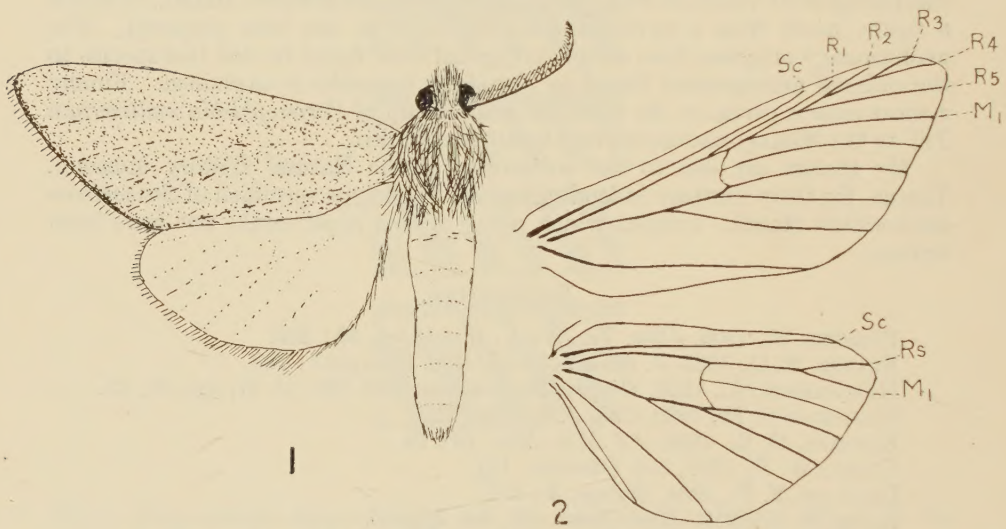
Sumeria gen. n.

Antenna with long pectinations to near apex. Palpus upcurved, closely appressed to frons. Fore-wing with veins R2, R3, R4, R5 and M1 stalked; hind-wing with vein Sc free and veins Rs and M1 proximally united for more than half their length. Male genital armature with tergite X undivided, valve divided; 8th sternite almost simple.

Type of the genus : *Sumeria dipotamica* sp. n.



Figs. 1–2.—*Sumeria dipotamica* Tams, gen. et sp. n. ♂, venation of wings.

Sumeria dipotamica sp. n.

♂. Antenna honey yellow. Palpus light buff. Head light buff. Thorax avellaneous. Pectus and legs light buff shaded with avellaneous. Abdomen light buff. Fore-wing avellaneous, termen darker (buffy brown), fringe cartridge buff. Hind-wing cartridge buff. Underside of fore-wing pinkish buff, of hind-wing cartridge buff. Expanse : 40–44 mm.

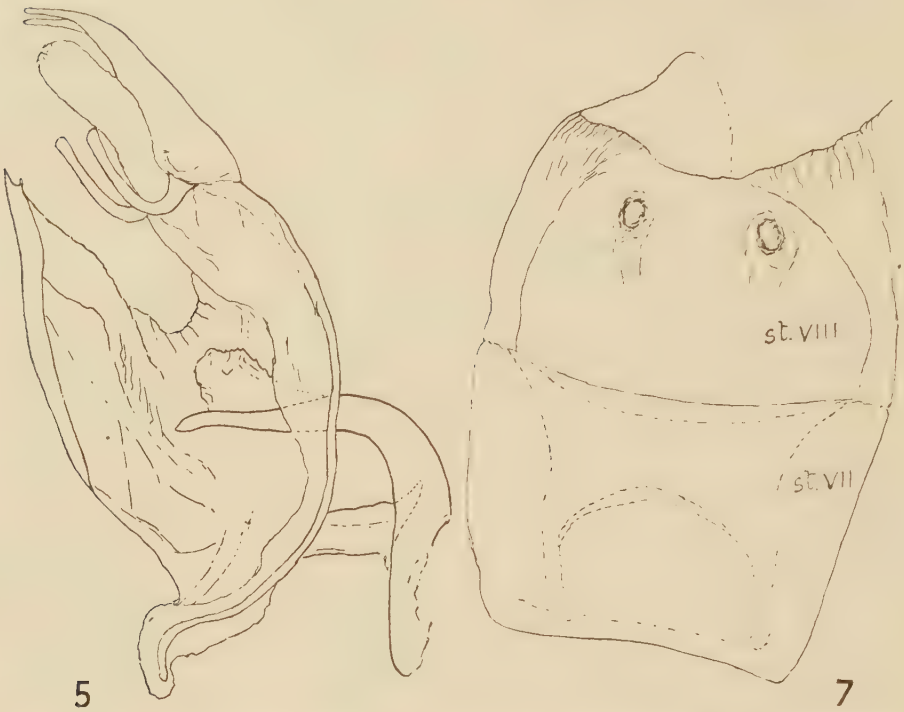
Holotype ♂ and 2 paratype ♂♂ : Persian Gulf : Fao. 2 paratype ♂♂ : Mesopotamia : Basrah, xi.1918 (*P. J. Barraud*). Paratype ♂ : Iraq : Provinz Arbil, x.1935 (*Général Grosse-Prague*). Paratype ♂ : Iran : Fars, Strasse Kazeroun-Bouchir, Tchouroum (circa 1000 m.) 6.iv.1937 (coll. *W. Brandt*). The two specimens last mentioned were sent over from the Paris Museum by Monsieur Ch. Boursin, and have been returned to their owners.

At first sight this genus appears to be related to *Turnaca* Walker (type *T. acuta* Walker), in which vein M1 of the fore-wing is not stalked with the radials,

Figs. 3–4.—3. *Turnaca acuta* Walker, venation of wings; 4. *Sumeria dipotamica*, ♂ genitalia (one valve removed).

Fig. 6.—*Sumeria dipotamica*, ♂, 8th sternite.

vein Sc of the hind-wing is joined to the middle of the upper margin of the cell by a slight bar, veins Rs and M1 of the hind-wing have a much shorter stalk,



Figs. 5, 7.—5. *Turnaca acuta* Walker, ♂ genitalia (one valve removed); 7. ♂, 8th sternite.

the 8th sternite is considerably modified, and the male genital armature has a divided tergite X and a simple valve.

(Colours from Ridgway, *Color Standards and Nomenclature*, 1912.)

NEW SPECIES OF JAVANESE STAPHYLINIDAE (COL.) COLLECTED BY MR. C. J. LOUWERENS

By Malcolm Cameron, M.B., R.N., F.R.E.S.

The types of unique specimens described herewith are in my collection, paratypes in the Louwerens collection. I have examined the types of all species used for comparison except *Holosus brevipennis* Fauv., *Megalopsidia uniformis* Bernh. and *Lathrobium ferreum* Fauv.

Oxytelinae.

Holosus louwerensi sp. n.

Shining black, antennae and legs reddish-brown, the last segment of the former reddish. Length 3·5 mm.

In size and build scarcely differing from *brevipennis* Fauv. but with the antennae a little longer, the penultimate segments less transverse; head as closely but more deeply punctured and with a similar fine transverse wavy ground sculpture; thorax with the sides more sinuate behind and with large fovea adjacent to the posterior angles, the base in the middle distinctly bi-impressed, the impressions separated by a narrow, slightly raised shining line, the puncturation and ground sculpture as in *brevipennis*. Elytra a little longer (6 : 4) than the thorax, as closely but much less finely punctured than in *brevipennis*, the punctures here and there longitudinally confluent. Abdomen with the lateral striae distinctly less fine and more oblique, the few punctures not so fine as in *brevipennis*.

E. Java: Res. Kediri, Slawe. Unique.

Trogophloeus (Troginus) louwerensi sp. n.

Moderately shining, black, the elytra pitchy black. Antennae and legs reddish-yellow, the former a little infuscate towards the apex. Length 2 mm.

Larger and distinctly more robust than *exiguus* Er., the antennae stouter, the elytra shorter. Subcylindrical, head scarcely narrower than the thorax, the eyes rather large; closely, obsoletely punctured, the punctures confused with the ground sculpture. Antennae with the 3rd segment shorter than the 2nd, 4th about as long as broad, 5th similar but stouter, 6th a little narrower than the 5th as long as broad, 7th to 10th gradually more transverse. Thorax transverse (3·3 : 2·5), convex, the sides gently rounded in front, straighter and distinctly retracted behind, at the middle of the base with two very small and obsolete impressions, closely finely but distinctly punctured, finely coriaceous. Elytra broader and slightly longer than the thorax, as closely but less finely punctured, finely coriaceous. Abdomen finely coriaceous, practically impunctate, very finely and sparingly pubescent.

E. Java: Toeloengagoeng.

Oxytelus (Tanycracrus) kedirianus sp. n.

Black or pitchy black, the elytra yellow, shining; head greasy lustrous, thorax and abdomen shining. Antennae black, the first four segments and legs reddish-yellow. Length 3–3·75 mm.

♂. Very near *lucidulus* Cam. but with much less shining head and scarcely transverse penultimate segments of the antennae etc. Head a little broader than the thorax, widened behind, the eyes moderate, not quite so long as the temples, clypeal region depressed, the frontal margin truncate, its anterior angles a little prominent and everted, strongly coriaceous and impunctate; neck separated by a fine arcuate sulcus obsolete in the middle; the whole surface except the neck coriaceous, the vertex finely, sparingly striate and practically impunctate, the post-ocular region finely and closely transversely striate and impunctate; neck without ground sculpture but with a few fine punctures; mandibles prominent, strongly curved. Antennae rather long, the 5th segment narrower than the 6th, 6th to 10th about as long as broad, the 11th as long as the 9th and 10th together. Thorax transverse (6 : 4), trapezoidal, the posterior angles rounded, the disc deeply and narrowly trisulcate, towards the sides with an impression which is rather coarsely punctate-striate; the disc with some minute punctures; ground sculpture absent. Elytra slightly longer than the thorax, finely, rather closely punctured and without striae or ground sculpture. Abdomen practically impunctate, coriaceous.

♀. Head smaller, narrower than the thorax, not dilated behind, the eyes larger, longer than the post-ocular region; frontal margin gently rounded, disc with a few punctures, not striate, coriaceous; thorax narrower (5 : 4); in other respects similar to the ♂.

♂. 6th ventral segment with a median subtriangular lobe, furnished with a tuft of

yellow setae at the apex, on each side broadly arcuately emarginate; 7th produced as a triangular plate with rounded apex.

E. Java: Res. Kediri, Pandan.

Osorius kedirianus sp. n.

Very near *fraterculus* Cam. but smaller (4·75 mm.) and narrower, the frontal margin gently rounded and furnished with 7 or 8 small blunt teeth, but the declivous part of the front is practically without sculpture in the middle, only a few minute scattered punctures being visible; the median impunctate area between the eyes is broader and on each side of it there are a few flat more or less confluent impressions; thorax less finely and more closely punctured, elytra more deeply and more closely punctured, abdomen a little more closely punctured than in that species.

E. Java: Res. Kediri, Pandan Aroem. Unique.

Bledius (Pucerus) louwerensi sp. n.

Head rather dull, black, the rest more shining, the thorax black, the elytra pitchy brown. Antennae reddish-yellow, the penultimate segments a little infuscate. Legs yellow. Length 3 mm.

Size, build and antennal structure of *gracilicornis* Kr. but with darker elytra, more superficial puncturation of thorax and weaker ground sculpture and with more finely punctured elytra. Head impunctate, rather dull, coriaceous, the clypeus with two little teeth. Antennae with very long 1st segment, 2nd to 4th longer than broad, decreasing in length, 5th as long as broad, 6th to 10th slightly transverse. Thorax slightly transverse, the sides parallel for the anterior two-thirds, then retracted and rounded with the base, along the middle with a narrow sulcus, rather closely, finely and superficially punctured, finely coriaceous. Elytra half as long again as the thorax, closely, rather finely and superficially punctured. Abdomen practically impunctate.

E. Java: Res. Kediri, Pandan Aroem, Samberbajem.

Megalopsidiinae.

Megalopsidia nigerrimus sp. n.

Very black, shining. Antennae reddish-yellow, the club dark. Legs reddish-yellow, the femora paler. Length 2 mm.

This species must be very near *uniformis* Bernh. from the Philippines, but differs in the sculpture of the thorax and elytra. Head very broad, much broader than the elytra, coarsely, moderately closely punctured. Antennae short, slender with large 3-segmented club. Thorax transverse (5·3 : 4·3), widest before the middle, the sides rather strongly retracted behind, with three small but distinct teeth between the anterior and posterior angles; just before the middle with a transverse arcuate, closely and strongly punctured sulcus, the surface in front of this closely and yet more coarsely punctured; along the posterior margin with a row of closely placed, moderate punctures, in the middle with a keel extending between this row and the sulcus, the punctures on each side of the keel very large, towards the sides smaller and less close. Elytra as long as but broader than the thorax, strongly transverse, the humeral angle prominent forming a smooth boss which is produced backwards as a narrow keel; the base on each side with one or two punctures, otherwise smooth, elsewhere with very large punctures. Abdomen conical, with a few punctures in the impressions and on the 7th segment and without oblique striae.

E. Java: Res. Kediri, Besoeki. Unique.

STENINAE.

Stenus (Hypostenus) cinctiventris sp. n.

Shining, black, the elytra each with a large round yellow marking almost reaching the sutural and lateral margins, the 3rd and 4th abdominal segments red. Antennae blackish, the first four segments and legs yellow. Length 5·5 mm.

Very near *pulcher* Motsch. but the antennae are darker towards the apex, the puncturation of the head finer, thorax a little shorter, not quite so coarsely punctured, elytra also rather less coarsely punctured, the yellow marking round extending nearer the suture, but on the other hand not so close to the humeral angle; the abdomen has the 3rd and 4th segments red and the puncturation though equally sparing is finer, finally the ground sculpture on the head, thorax and abdomen is more evident and the elytra also are distinctly coriaceous, whereas in *pulcher* ground sculpture is absent.

♂. Unknown.

E. JAVA: Res. Kediri, Djatiwekas. Unique.

PAEDERINAE.

Lathrobium (s.str.) **quadriceps** sp. n.

Shining, reddish-brown, the head sometimes darker; the elytra red with the postero-external region blackish. Antennae and legs yellowish-red. Length 6·5–7 mm.

In colour and square head resembling *ferreum* Fauv. but much smaller etc. Head scarcely broader than long, quadrate, as broad as the thorax, the temples parallel, the posterior angles briefly rounded, the eyes small; middle of the disc impunctate, elsewhere with moderately close, rather small umbilicate punctures and here and there with a few much smaller ones, the post-ocular region only with a fine ground sculpture. Antennae with all the segments longer than broad, oval, narrowed at the base, gradually decreasing in length. Thorax very slightly longer than broad, the sides straight and retracted backwards, the posterior angles rounded, along the middle with rather broad impunctate space, elsewhere with larger and smaller umbilicate punctures irregularly distributed: ground sculpture absent. Elytra longer (5 : 4) than the thorax, serially punctured. Abdomen extremely finely, sparingly punctured, finely coriaceous. Pubescence sparing.

♂. 6th ventral segment with narrow arcuate emargination.

E. JAVA: Res. Kediri, Besoeki. Toeloengagoeng.

Belonuchus kedirianus sp. n.

Shining, black, the elytra red. Antennae black, the first two segments and legs red. Length 11·5 mm.

In the large size and broad build resembling *bakeri* Bernh. and with similarly constructed antennae, the head, however, has more numerous punctures, the elytra are more finely punctured, the abdomen, however, scarcely differs in sculpture from that species. Head quadrate, broader than the thorax, very slightly broader than long, at the posterior angle with a denticle, the front with four small punctures placed trapezoidally, behind these on each side with a group of 5 or 6 punctures and on each side of the disc with 3 others in an oblique row, before the base with the usual transverse row of punctures; ground sculpture distinct. Thorax with small emargination behind the anterior angles and with a discal row of 6 or 7 small punctures, the ground sculpture as on the head. Elytra a fourth longer than the thorax with moderately close and moderately fine puncturation. Abdomen

much more coarsely and deeply punctured than the elytra as in *bakeri* and with a triangular smooth space in the middle of each segment.

♂. Unknown.

E. Java : Res. Kediri, Toempoek. Unique.

Belonuchus associatus sp. n.

Shining black, the elytra yellowish-red. Antennae black, the first two segments and legs yellowish-red. Length 9·5 mm.

B. associatus var. **morosus** var. n.

Elytra black, base of antennae and legs pitchy black. Smaller than *kedirianus*, the antennae a little shorter with more transverse penultimate segments, head shorter and more transverse, distinctly broader than long (7·3 : 5·3), without group of punctures behind the four frontal ones, but only with two placed obliquely on each side of the disc; thorax with dorsal row of four or five punctures; elytra a fourth longer than broad, the puncturation as in *kedirianus*, the abdomen more finely, less deeply and more sparingly punctured than in that species. Every gradation of colour is found between the type form and the variety.

E. Java : Res. Kediri, Toempoek.

Staphylininae.

Belonuchus javanus sp. n.

Shining, black, antennae black, the 1st and 2nd segments reddish, the 11th orange-red. Legs yellowish-brown. Length 8–9 mm.

In size, build and antennal structure scarcely differing from *rufoniger* Fauv. The puncturation of the head is similar but with an additional puncture on each side before the middle of the base, the sculpture of the thorax is as in that species, the elytra, however, are less finely, more deeply, and the abdomen less finely and less closely punctured and with an extensive area in the middle of each segment impunctate. The head and thorax are without trace of the iridescence seen in *rufoniger* in certain lights.

E. Java : Res. Kediri : Besoeki, Samberbajem.

Staphylinus (Platydracus) auroaeneus sp. n.

Head black, greenish-brassy between the eyes; thorax greenish-brassy, the side margins narrowly yellowish; scutellum black, velvety and with a spot of yellow pubescence; elytra blackish, the shoulders and reflexed margin reddish-yellow, variegated with greenish-golden pubescence. Abdomen blackish, the first five segments each with a patch of golden pubescence along the middle and black bifariate, the sides closely yellow pubescent. Antennae black, the first two segments and legs yellow, the tarsi reddish. Length 12 mm.

Head transverse, widest behind, the posterior angles rather broadly rounded, the eyes longer than the temples; in the middle between the eyes with a short shining line, otherwise closely covered with moderate umbilicate punctures and long, close golden pubescence. Penultimate segments of antennae fully twice as broad as long. Thorax as long as broad, before the scutellum with a short smooth space, the sculpture and pubescence as on the head. Elytra as long as the thorax, strongly coriaceous, mottled with patches of short yellow pubescence and also with longer golden hairs.

E. Java : Res. Kediri, Pandan Aroem. Unique.

Staphylinus (Platydracus) contiguus sp. n.

Head and thorax bronze-black; elytra reddish-brown; abdomen brown, the posterior margins of the segments obscurely reddish, the first three segments obscurely bifariate, the first four with small ill-defined patches of golden pubescence in the middle and at the sides. Antennae with the 1st and 2nd segments red, the 8th to 11th reddish, the rest black. Legs yellow. Length 14 mm.

In build and colour very like *chalceus* Bernh. but the head is less transverse; the post-ocular region slightly but distinctly widened, longer than in *chalceus* but shorter than the eye, the sculpture not quite so coarse; thorax formed as in *chalceus* but less brassy, the sculpture rather finer, the pubescence brown; elytra as in *chalceus*; abdomen with the median golden pubescence less distinct, more sparing, the long pubescence reddish-brown as on the fore-parts, not golden as in *chalceus*.

E. Java: Res. Kediri, Pandan Aroem. Unique.

Ontholestes elegans sp. n.

Head black, the anterior border yellowish-red, closely covered with short golden pubescence; thorax black, the anterior angles, sides and base yellowish-red, closely covered with short golden pubescence and spots of silvery hairs, one at the anterior angle, another about the middle of the side, one on each side of the disc and one in the middle near the base; scutellum black, velvety; elytra black, the anterior angles, reflexed and posterior margins yellowish-red, closely covered with short golden pubescence variegated with tufts of silvery and black hairs; abdomen black, the posterior margins of the first two and last segments broadly yellowish-red, the base of the first two segments each with a black velvety spot at the base on each side of the middle, the first three segments each with a median and lateral spot of golden hairs; 5th segment with transverse fascia of silvery pubescence at the base; besides these with numerous long golden and black hairs. Antennae yellowish-red. Legs yellow, the femora with a black marking about the middle, the anterior and middle tibiae blackish externally. Length 12 mm.

Very similar to *marmoratus* Er. in the colour of the fore-parts and pubescence, but more brightly coloured, the head broader, distinctly broader than the thorax, the sculpture a little coarser. Antennae longer and thinner, 3rd to 5th segments distinctly longer than broad, the following serrate, scarcely transverse. Thorax as in *marmoratus*, the sculpture as on the head. Elytra a little longer than in *marmoratus*, the variegated pattern very similar.

E. Java: Res. Kediri, Kalibamban. Unique.

Naddia kediriana sp. n.

Black, greasy lustrous, the abdomen more shining. Antennae black. Legs pitchy black, the apex of the tarsi reddish. Length 13–14 mm.

Colour and lustre of *assamensis* and very similar in build, but with the sculpture of the head and thorax finer, the latter with the sides more rounded and retracted behind, elytra less strongly sculptured, the fringe on the posterior margin shorter and more silvery, the patches of pubescence on the abdomen less marked and more silvery. In other respects like *assamensis*. From *vethi* Bernh. it is at once distinguished by the much finer sculpture and the longer elytra.

E. Java: Res. Kediri, Toempoek, Toempa Meije, Kalibamban.

A NEW GENUS OF HECABOLINAE AND A NOTE ON THE GENUS *TELEBOLUS* MARSHALL (HYM., BRACONIDAE)

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The material on which the present paper is based was submitted for identification by Mr. J. C. M. Gardner of the Forest Research Institute, Dehra Dun.

The types of the new species are in the British Museum.

Hecabolinae.

Aivalykus gen. n.

Head of typical Doryctine and Hecaboline form and showing no distinctive structure. Antennae with at least 24 segments; scape very short, cup-shaped, slightly shorter than its apical width; pedicel only slightly shorter than the scape; funicle 1 sometimes markedly bent and, at any rate, slightly produced and swollen at extreme apex so that the joint between funicle 1 and 2 is different from that between the other funicular segments. Ocelli arranged in a triangle the base of which is longer than its sides. Maxillary palpi 5-, labial palpi 3-segmented. *Mesonotum* conspicuously truncated in front, falling away perpendicularly, or almost so, to the pronotum. Pronotum very short, lying far below the dorsal level of the mesonotum and projecting only very lightly beyond it. Course of the notauli indicated by some sort of sculpture. Mesopleura almost everywhere shining and unsculptured; sternauli either present as a straight narrow groove or absent. Legs: front tibiae with a row of spines; middle tibiae with at most 2–3 spines towards base; outer apical margin of the hind tibiae without a row of spines; hind coxae without a trace of a projection at base beneath. Wings more or less uniform in tint even if dusky; recurrent nervure interstitial or received into the 1st cubital cell; nervus parallelus exactly interstitial; submedian cell of fore-wings very narrow, of equal width throughout; no trace whatever of a 2nd transverse cubitus; 2nd cubital cell gradually widened from base to apex; nervulus present; 1st abscissa of the radius forming almost a right angle with the 2nd; lower basal cell of hind-wings virtually absent, only a short portion of the lower limiting nervure being defined. *Abdomen* of ♀ long and narrow in the genotype but less so in the second species. Petiole at least 1½ times as long as its apical width. Ovipositor nearly as long as the body. Abdomen of genotype ♂ (the ♂ of the second species is not known) much modified and greatly lengthened.

Type of the genus :—*Aivalykus eclectes* sp. n.

In Szepligeti's key to the genera of the Hecabolinae in the *Genera Insectorum*, this genus runs to *Monolexis* Förster. The type of this latter genus is given as *M. försteri* Marshall since Förster described no species. In *försteri*, as Marshall shows in his figure and description, the nervus parallelus is not interstitial but is received into the lower, external angle of the second discoidal cell.

Hecabolus Curtis as typified in the genotype *sulcatus* Curtis has a very different facies and has the middle tarsi much shorter (not a sound generic character in my opinion); this genus, like *Monolexis*, has the recurrent nervure received into the lower external angle of the second discoidal cell.

Aivalykus eclectes sp. n.

♂♀. Dark brown; head paler, becoming brownish-yellow on face, temples and behind the eyes; smooth lateral margins of tergite (2, 3) in ♀ to sides of the sculptured area, and the lateral margins of the following tergites, brownish-yellow. Legs in small individuals of both sexes yellow throughout; in large ♀♀ a faint dusky spot appears on each side of the hind femora at apex; in ♂♂ these spots are more extensive and tend to coalesce to form a dark ring.

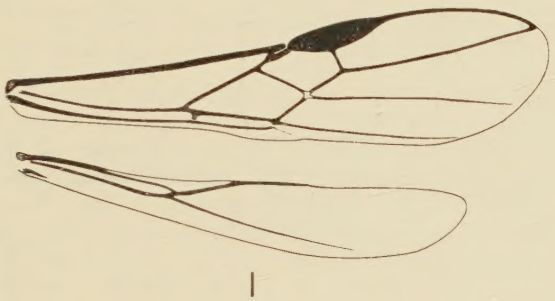
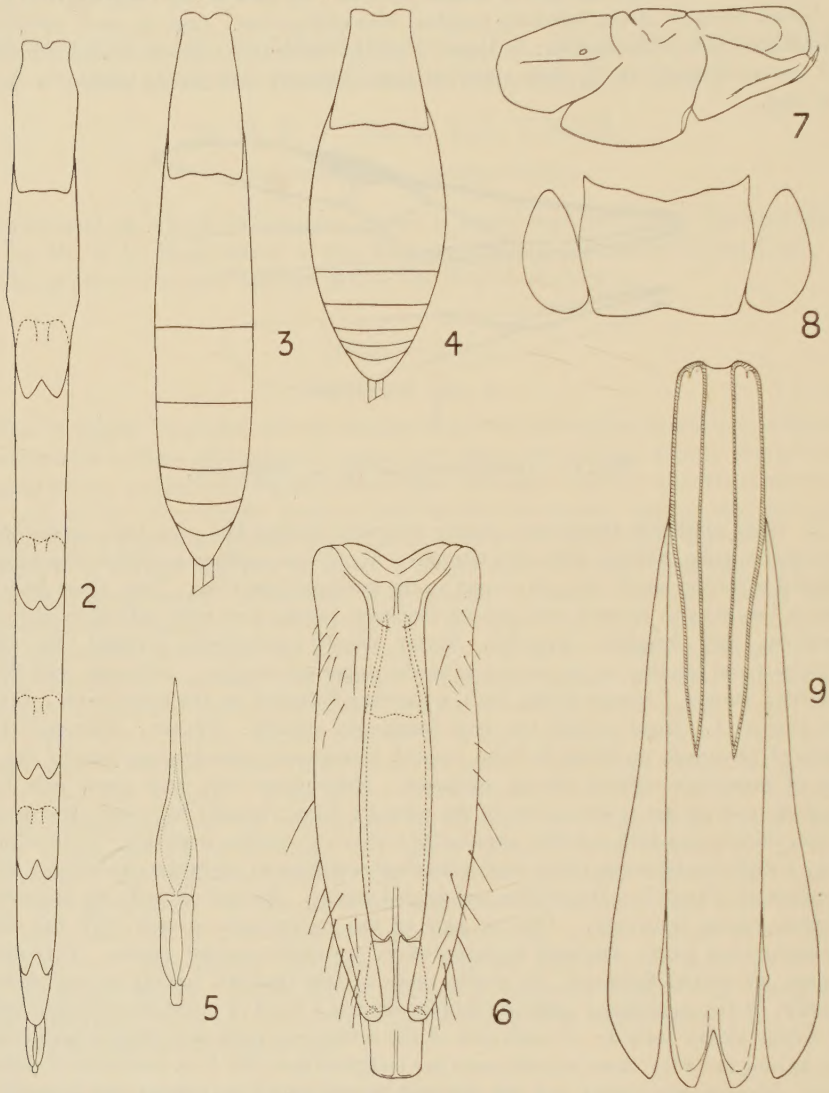


Fig. 1.—*Aivalykus eclectes* sp. n., wings of ♀.

♀. *Head* markedly transverse, clearly narrower behind the eyes than across them. Clypeus triangular, sharply delimited laterally; at its base continuous with a longitudinal, flattened elevation which extends almost to the antennal insertions. Face apart from the more or less smooth clypeus and central elevation shining and with indication of feeble, transverse, very irregular, striation. Vertex evenly transversely striated, the striae continuous and tending to be concentric at the upper eye-margin. Antennae with 30–35 segments; funicle 1 conspicuously bent, somewhat flattened on the inner curve; funiclé 2 as long as 1. Head behind the eyes completely smooth. *Thorax:* Extreme apical margin of pronotum produced to form a short, transparent, membranous lamella (fig. 7); sides of pronotum without strong sculpture. Mesonotum with very short pale hairs restricted more or less to the course of the notauli; lobes virtually bare over their greater surface, shining and with a feeble, apparently transverse, surface sculpture; this sculpture is only a slight modification of the scaly-reticulate sculpture so prevalent on the lobes of the mesonotum in Doryctine, Hecaboline and related genera. Notauli defined only as bands of irregular, rugose sculpture. Convex part of the mesopleura covered with fine short semi-decumbent hairs; sternauli represented by a straight narrow groove. Propodeum elongate, somewhat flattened; in profile more or less straight, having no well-defined posterior, declivous surface; along its middle extends a band of punctate-reticulate sculpture which widens behind; on each side of the sculptured band is a smooth area, about twice as long as wide; these smooth areas are margined laterally by a somewhat ill-defined carina; between this carina and the external carina (which lies outside the spiracles) is enclosed a narrow area which may be sculptured all over or smooth along the middle. Fore-wing (fig. 1): recurrent nervure sometimes interstitial, sometimes received into the extreme base of the 2nd cubital cell; 2nd abscissa of radius straight. Legs: middle tibiae with two spines just behind middle; segment 2 of hind tarsus nearly as long as 1, about 13 : 15; 3 nearly 1½ times as long as 5; middle tarsus long, slender, its 2nd segment only slightly shorter than 1st. *Abdomen* long, narrow, parallel-sided (fig. 3). Petiole more than twice as long as its apical width, about 9 : 4, coarsely reticulate-rugose all over; tergite (2, 3) deeply and evenly striated to within a quarter of apex; basally the striations tend to break up to form a sculpture resembling that of the petiole; no trace of a suture

between the fused 2nd and 3rd tergite; tergites beyond (2, 3) completely smooth. Ovipositor about as long as the body, very fine; its sheaths, on the other hand, unusually wide for the width of the ovipositor, being about 4 times as wide as this.



Figs. 2–9.—2, *Aivalykus eclectes* sp. n., abdomen of ♂; 3, abdomen of ♀; 4, *A. sperches* sp. n., abdomen of ♀; 5–9, *A. eclectes* sp. n.: 5, genitalia of ♂ to show the much elongated basal structure; 6, genitalia of ♂; 7, thorax of ♀, lateral; 8, *simplex* form. n., tergite 6 of ♂ with epipleurae folded out; 9, tergite 6 of ♂ with epipleurae folded out.

♂. Antennae apparently with fewer segments than the ♀, 24–32. Hind femora tending to be swollen, especially in largest individuals in which, seen in profile, they are roundly angled at base. Hind-wing like that of the ♀. *Abdomen:* Petiole like that of the ♀ in shape and sculpture. Tergite (2, 3) with only a trace of sculpture at extreme base and then more especially towards the sides; this tergite (*i.e.* 2 plus 3) shows normal sclerotisation

restricted to a basal area which is roughly ⅓ the length of the petiole. The abdomen is otherwise extraordinarily modified, tergites (2, 3)–6 being more or less parallel-sided, completely flattened and much longer than wide; in what I take to be the normal position of these tergites (fig. 2), they are telescoped one within the other by nearly half their length; they are provided with rod-like thickenings in the chitin of their basal half (fig. 9); further, tergites (2, 3)–6 are deeply emarginate at apex and thin and membranous along the middle. Genitalia, except for the basal structure, freely exposed beyond the apical tergite (figs. 5, 6).

Length: ♂, 5–7 mm. (tergites fully retracted); 1 ♂ with the tergites apparently fully exserted measures 9·5 mm. ♀, 4·5–5·4 mm. (without ovipositor).

United Provinces: Dehra Dun, Jhajra: (*N. C. Chatterjee*), 6 ♀♀, 2 ♂♂, bred ii.–iii.1926 and 2 ♀♀, 2 ♂♂, bred v.–vi.1925 from wood of *Shorea robusta* Gaertner; (*C. F. C. Beeson*), 5 ♂♂, 5 ♀♀ *Holo- and Allotype*, bred ix.–x.1925 from wood of *Terminalia tomentosa* W. & A.; Golatappar: (*C. F. C. B.*), 3 ♂♂, 8 ♀♀, bred xi.1922 and iv.1923 from *Shorea robusta* Gaertn.; Thano R.: (*C. F. C. B.*), 5 ♂♂, 9 ♀♀, bred iv.–v.1923 from *Shorea robusta* Gaertn.; Lachiwala R.: (*N. C. Chatterjee*), 4 ♂♂, 8 ♀♀, bred viii.1922 from *Shorea robusta* Gaertn.; Central Provinces: Mandla, Banja R., Kanha: (*D. J. Atkinson*), 5 ♂♂, bred iv.1926 ex?

I have examined a series of this species from the Philippines: Arorog, vii.1917 and Port Banga, xii.1914 (Böttcher) and can find no differences of sufficient magnitude to justify even a varietal name. On the whole, the elongate, smooth areas of the propodeum are less delimited in these examples and show a considerable amount of sculpture, especially basally.

Aivalykus eclectes f. simplex form. n.

While working through the material of *eclectes*, I came across 7 males in which the abdomen is completely unmodified. Apart from this very striking difference and a minor one in the shape of the genitalia (the cardo is less attenuated basally), these ♂♂ agree in every particular with the ♂ I associate with ♀ *eclectes*. In one particular they agree more with ♀ *eclectes* than do ♂ *eclectes*; tergite (2, 3), being unmodified, shows a sculpture, which both in degree of strength and in extent shows a more obvious similarity to that of the ♀ than does the modified tergite of ♂ *eclectes* (fig. 8).

These 7 males are smaller than average *eclectes* ♂, the head and thorax together being 1·3–1·4 mm., while head and thorax of typical *eclectes* are about 2 mm.

United Provinces: Golatappar: (*C. F. C. Beeson*), xii.1922, 3 ♂♂ (one the type), iv.1923, 1 ♂, iv.1923, all ex *Shorea robusta* Gaertn.; Thano R.: (*C. F. C. B.*), iv.1923, 1 ♂ ex *Shorea robusta* G.; Jhajra: (*C. F. C. B.*), 2 ♂♂, bred x.–xi.1925 ex *Terminalia tomentosa* W. & A.

The appearance of these males seems to point to two conclusions: (1) that ♀ *eclectes*, as I interpret it, is a mixture of two species (a most exhaustive search has failed to reveal any differences), (2) that *eclectes* has two forms of the male, the more frequent and hence normal male being the modified form which I associate definitely with the female; the other, a small form, in which abdominal modification, for some reason, has not taken place.

Similarity of data, as well as similarity in all the somewhat distinctive features (form of pronotum, shape and sculpture of propodeum and long second segment of hind tarsus) which characterise typical *eclectes*, lead me to support the second conclusion.

Aivalykus sperches sp. n.

♀. This species is not very closely related to *eclectes* and certainly belongs to a different species-group, if not to a different genus. The most obvious differences between the two species lie in the shape of the abdomen and the sculpture of tergite (2, 3). The present species may be compared with *eclectes* as follows :—

Head of same shape but the eyes distinctly smaller. Striations of vertex much finer, fading out at temples; those in front show no tendency to be continuous with those behind. Face above the clypeus with a feebly delimited area which is widened below. Antennae with 25–26 segments; funicle 1 less flattened and less bow-shaped than in *eclectes*. *Thorax :* Extreme apical margin of pronotum not produced to form a membranous lamella. Mesonotum more shining, the ground sculpture weaker; posterior sunken area less rugose, the outstanding rugosities being two raised, convergent, broken ridges which mark the posterior limits of the notauli. Mesopleura without sternauli and virtually without hairs on the central, convex part. Propodeum shorter, the dorsal, virtually smooth areas not longer than wide; distribution of sculpture on the propodeum less characteristic, there being no conspicuous central band of sculpture; the central carina is margined on each side with irregular punctures; no trace of an areola, the costulae arising from the central carina at right angles to it; no trace of an internal lateral carina, only the external being present; this is usually sculptured to the same degree along each side. Second abscissa of the radius feebly curved; recurrent nervure received into the 1st cubital cell by a distance equal to about $\frac{1}{4}$ its own length. *Abdomen* much less elongate (fig. 4), not in the least parallel-sided, narrowly ovate. Petiole evenly widened to apex, longer than its apical width, about 4 : 3, smoothly striated all over; base of tergite (2, 3) with a variable amount of smooth striation which is sometimes almost absent. Ovipositor about as long as the body, its sheaths normal, not at all widened as in *eclectes*.

Length : ♀, about 4 mm. (without ovipositor).

United Provinces : Lansdowne, Nauri, 2500 ft. : (*B. M. Bhatia*), 5 ♀♀ (one the type), bred 29–30.iii.1926 from wood of *Phoebe lanceolata* Nees.

Telebolus Marshall.

Telebolus Marshall, 1888, *in* André, *Spec. Hym. d'Eur.* **4** : 202.

The genotype, *T. corsicus* Marshall, is in the British Museum. Owing to its being gummed on to a card with the wings out-spread, it is not easy to make out the venation. Marshall says both 1st and 2nd transverse cubiti are absent as well as the 1st abscissa of the cubitus. Actually these three veins are present though faint; the radius is angled in two places to mark the origin of the two transverse cubiti. The genus has thus three cubital cells, and in my opinion is a typical member of the Doryctinae, not of the Hecabolinae where Marshall placed it. It differs from typical *Doryctes* only in having the nervus parallelus interstitial. The hind coxae have a small projection at base.